

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (canceled)

2. (canceled)

3. (canceled)

4. (canceled)

5. (original) A computer system, comprising:

a processor programmed to perform an arithmetic performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining coefficients  $(A + \alpha_t)$ , where the values  $\alpha_t$  are defined as

$$\alpha_t = \left[ \frac{R - \bar{R} - A \sum_{k=1}^T (R_k - \bar{R}_k)}{\sum_{k=1}^T (R_k - \bar{R}_k)^2} \right] (R_t - \bar{R}_t),$$

where  $A$  has any predetermined value,  $R_t$  is a portfolio return for period  $t$ ,  $\bar{R}_t$  is a benchmark return for period  $t$ ,  $R$  is determined by

$$R = \left[ \prod_{t=1}^T (1 + R_t) \right] - 1,$$

and  $\bar{R}$  is determined by

$$\bar{R} = \left[ \prod_{t=1}^T (1 + \bar{R}_t) \right] - 1;$$

and determining the portfolio relative performance as

$$R - \bar{R} = \sum_{t=1}^T (A + \alpha_t)(R_t - \bar{R}_t); \text{ and}$$

a display device coupled to the processor for displaying a result of the arithmetic performance attribution computation.

6. (original) A computer readable medium which stores code for programming a processor to perform an arithmetic performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining coefficients  $(A + \alpha_t)$ , where the values  $\alpha_t$  are defined as

$$\alpha_t = \left[ \frac{R - \bar{R} - A \sum_{k=1}^T (R_k - \bar{R}_k)}{\sum_{k=1}^T (R_k - \bar{R}_k)^2} \right] (R_t - \bar{R}_t),$$

where  $A$  has any predetermined value,  $R_t$  is a portfolio return for period  $t$ ,  $\bar{R}_t$  is a benchmark return for period  $t$ ,  $R$  is determined by

$$R = \left[ \prod_{t=1}^T (1 + R_t) \right] - 1,$$

and  $\bar{R}$  is determined by

$$\bar{R} = \left[ \prod_{t=1}^T (1 + \bar{R}_t) \right] - 1;$$

and determining the portfolio relative performance as  $R - \bar{R} = \sum_{t=1}^T (A + \alpha_t)(R_t - \bar{R}_t)$ .

7. (canceled)

8. (canceled)

9. (canceled)

10. (original) A computer system, comprising:

a processor programmed to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining attribution effects for issue selection  $(1 + I_{it}^G)$  given by

$$1 + I_{it}^G = \frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}} \Gamma_t^I,$$

and determining attribution effects for sector selection  $(1 + S_{it}^G)$  given by

$$1 + S_{it}^G = \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}} \right) \left( \frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t} \right) \Gamma_t^S,$$

where  $r_{jt}$  is a portfolio return for sector  $j$  for period  $t$ ,  $\bar{r}_{jt}$  is a benchmark return for sector  $j$  for period  $t$ ,  $w_{jt}$  is a weight for  $r_{jt}$ ,  $\bar{w}_{jt}$  is a weight for  $\bar{r}_{jt}$ ,  $R$  is determined by

$$R = \left[ \prod_{t=1}^T (1 + R_t) \right] - 1$$

and  $\bar{R}$  is determined by

$$\bar{R} = \left[ \prod_{t=1}^T (1 + \bar{R}_t) \right] - 1,$$

and determining the portfolio performance as

$$\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^T \prod_{i=1}^N (1 + I_{it}^G)(1 + S_{it}^G);$$

and

a display device coupled to the processor for displaying a result of the geometric performance attribution computation.

11. (original) The system of claim 10, wherein the values of  $\Gamma_t^1$  are

$$\Gamma_t^I = \left[ \frac{1 + R_t}{1 + \bar{R}_t} \prod_{j=1}^N \left( \frac{1 + w_{jt} \bar{r}_{jt}}{1 + w_{jt} r_{jt}} \right) \right]^{1/N} \text{ and the values of } \Gamma_t^S \text{ are}$$

$$\Gamma_t^S = \left[ \frac{1 + \bar{R}_t}{1 + \bar{R}_t} \prod_{j=1}^N \left( \frac{1 + \bar{w}_{jt} \bar{r}_{jt}}{1 + w_{jt} \bar{r}_{jt}} \right) \left( \frac{1 + w_{jt} \bar{R}_t}{1 + \bar{w}_{jt} \bar{R}_t} \right) \right]^{1/N}.$$

12. (original) A computer readable medium which stores code for programming a processor to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining attribution effects for issue selection  $(1 + I_{it}^G)$  given by

$$1 + I_{it}^G = \frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}} \Gamma_t^I,$$

and determining attribution effects for sector selection  $(1 + S_{it}^G)$  given by

$$1 + S_{it}^G = \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}} \right) \left( \frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t} \right) \Gamma_t^S,$$

where  $r_{jt}$  is a portfolio return for sector  $j$  for period  $t$ ,  $\bar{r}_{jt}$  is a benchmark return for sector  $j$  for period  $t$ ,  $w_{jt}$  is a weight for  $r_{jt}$ ,  $\bar{w}_{jt}$  is a weight for  $\bar{r}_{jt}$ ,  $R$  is determined by

$$R = \left[ \prod_{t=1}^T (1 + R_t) \right] - 1$$

and  $\bar{R}$  is determined by

$$\bar{R} = \left[ \prod_{t=1}^T (1 + \bar{R}_t) \right] - 1; \text{ and determining the portfolio performance as}$$

$$\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^T \prod_{i=1}^N (1 + I_{it}^G)(1 + S_{it}^G).$$

13. (original) The computer readable medium of claim 12, wherein the values of

$$\Gamma_t^I \text{ are } \Gamma_t^I = \left[ \frac{1 + R_t}{1 + \bar{R}_t} \prod_{j=1}^N \left( \frac{1 + w_{jt} \bar{r}_{jt}}{1 + w_{jt} r_{jt}} \right) \right]^{1/N} \text{ and the values of } \Gamma_t^S \text{ are}$$

$$\Gamma_t^S = \left[ \frac{1 + \bar{R}_t}{1 + \bar{R}_t} \prod_{j=1}^N \left( \frac{1 + \bar{w}_{jt} \bar{r}_{jt}}{1 + w_{jt} \bar{r}_{jt}} \right) \left( \frac{1 + w_{jt} \bar{R}_t}{1 + \bar{w}_{jt} \bar{R}_t} \right) \right]^{1/N}.$$

14. (canceled)

15. (canceled)

16. (original) A computer system, comprising:

a processor programmed to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining attribution effects  $1 + Q_{ijt}^G$

given by

$$1 + Q_{ijt}^G = \prod_k \left( \frac{1 + a_{ijt}^k}{1 + b_{ijt}^k} \right) \Gamma_{ijt}^k,$$

where  $\Gamma_{ijt}^k$  are corrective terms that satisfy the constraint  $\prod_{ij} (1 + Q_{ijt}^G) = \frac{1 + R_t}{1 + \bar{R}_t}$ , each of

$a_{ijt}^k$  and  $b_{ijt}^k$  is a coefficient for attribution effect  $j$ , sector  $i$ , and period  $t$ , the

coefficients  $a_{ijt}^k$  and  $b_{ijt}^k$  are obtained from arithmetic attribution effects

$Q_{ijt}^A = \sum_k a_{ijt}^k - \sum_k b_{ijt}^k$  which correspond to the attribution effects  $1 + Q_{ijt}^G$ ,  $R_t$  is a

portfolio return for period  $t$ ,  $\bar{R}_t$  is a benchmark return for period  $t$ ,  $R$  is determined by

$$R = \left[ \prod_{t=1}^T (1 + R_t) \right] - 1$$

and  $\bar{R}$  is determined by

$$\bar{R} = \left[ \prod_{t=1}^T (1 + \bar{R}_t) \right] - 1, \text{ and}$$

determining the portfolio performance as  $\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^T \prod_{i=1}^N \prod_{j=1}^M (1 + Q_{ijt}^G)$ ; and

a display device coupled to the processor for displaying a result of the geometric performance attribution computation.

17. (original) The system of claim 16, wherein  $M = 2$ ,  $1 + Q_{it}^G$  are attribution

effects for issue election given by  $1 + Q_{it}^G = \frac{1 + w_{it} r_{it}}{1 + w_{it} \bar{r}_{it}} \Gamma_t^I$ , and  $1 + Q_{i2t}^G$  are attribution

effects for sector selection given by  $1 + Q_{i2t}^G = \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}} \right) \left( \frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t} \right) \Gamma_t^S$ ,

where  $r_{it}$  is a portfolio return for sector  $i$  for period  $t$ ,  $\bar{r}_{it}$  is a benchmark return for

sector  $i$  for period  $t$ ,  $w_{it}$  is a weight for  $r_{it}$ ,  $\bar{w}_{it}$  is a weight for  $\bar{r}_{it}$ , the values of  $\Gamma_t^I$  are

$$\Gamma_t^I = \left[ \frac{1 + R_t}{1 + \bar{R}_t} \prod_{i=1}^N \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + w_{it} r_{it}} \right) \right]^{1/N}, \text{ and}$$

the values of  $\Gamma_t^S$  are  $\Gamma_t^S = \left[ \frac{1 + \bar{R}_t}{1 + \bar{R}_t} \prod_{i=1}^N \left( \frac{1 + \bar{w}_{it} \bar{r}_{it}}{1 + w_{it} \bar{r}_{it}} \right) \left( \frac{1 + w_{it} \bar{R}_t}{1 + \bar{w}_{it} \bar{R}_t} \right) \right]^{1/N}$ .

18. (original) A computer readable medium which stores code for programming a processor to perform a geometric performance attribution computation to determine portfolio performance, relative to a benchmark, over multiple time periods  $t$ , where  $t$  varies from 1 to  $T$ , by determining attribution effects  $1 + Q_{ijt}^G$  given by

$$1 + Q_{ijt}^G = \prod_k \left( \frac{1 + a_{ijt}^k}{1 + b_{ijt}^k} \right) \Gamma_{ijt}^k,$$

where  $\Gamma_{ijt}^k$  are corrective terms that satisfy the constraint  $\prod_{ij} (1 + Q_{ijt}^G) = \frac{1 + R_t}{1 + \bar{R}_t}$ , each of

$a_{ijt}^k$  and  $b_{ijt}^k$  is a coefficient for attribution effect  $j$ , sector  $i$ , and period  $t$ ,  $R_t$  is a portfolio return for period  $t$ , the coefficients  $a_{ijt}^k$  and  $b_{ijt}^k$  are obtained from arithmetic attribution effects  $Q_{ijt}^A = \sum_k a_{ijt}^k - \sum_k b_{ijt}^k$  which correspond to the attribution effects

$1 + Q_{ijt}^G$ ,  $\bar{R}_t$  is a benchmark return for period  $t$ ,  $R$  is determined by

$R = [\prod_{t=1}^T (1 + R_t)] - 1$ , and  $\bar{R}$  is determined by  $\bar{R} = [\prod_{t=1}^T (1 + \bar{R}_t)] - 1$ , and determining

the portfolio performance as  $\frac{1 + R}{1 + \bar{R}} = \prod_{t=1}^T \prod_{i=1}^N \prod_{j=1}^M (1 + Q_{ijt}^G)$ .

19. (original) The computer readable medium of claim 18, wherein  $M = 2$ ,

$1 + Q_{i1t}^G$  are attribution effects for issue election given by  $1 + Q_{i1t}^G = \frac{1 + w_{it} r_{it}}{1 + \bar{w}_{it} \bar{r}_{it}} \Gamma_t^I$ , and

$1 + Q_{i2t}^G$  are attribution effects for sector selection given by

$$1 + Q_{i2t}^G = \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + \bar{w}_{it} \bar{r}_{it}} \right) \left( \frac{1 + \bar{w}_{it} \bar{R}_t}{1 + w_{it} \bar{R}_t} \right) \Gamma_t^S,$$

where  $r_{it}$  is a portfolio return for sector  $i$  for period  $t$ ,  $\bar{r}_{it}$  is a benchmark return for sector  $i$  for period  $t$ ,  $w_{it}$  is a weight for  $r_{it}$ ,  $\bar{w}_{it}$  is a weight for  $\bar{r}_{it}$ , the values of  $\Gamma_t^I$  are

$$\Gamma_t^I = \left[ \frac{1 + R_t}{1 + \bar{R}_t} \prod_{i=1}^N \left( \frac{1 + w_{it} \bar{r}_{it}}{1 + w_{it} r_{it}} \right) \right]^{1/N}, \text{ and}$$

the values of  $\Gamma_t^s$  are  $\Gamma_t^s = \left[ \frac{1 + \tilde{R}_t}{1 + \bar{R}_t} \prod_{i=1}^N \left( \frac{1 + \bar{w}_i \bar{r}_i}{1 + w_i \bar{r}_i} \right) \left( \frac{1 + w_i \bar{R}_t}{1 + \bar{w}_i \bar{R}_t} \right) \right]^{1/N}$ .